

## REMARKS

Claims 1-44 are pending in the application. By this paper, a Declaration Under 37 CFR 1.131 has been submitted. Reconsideration of claims 1-44 in view of this Declaration and the arguments herein is respectfully requested.

### Allowable Subject Matter

Claims 21-29 stand allowed. Moreover, claims 6-11, 16, 19-20, 35-37 and 42-43 stand objected to as being dependent on a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. As described below, it is submitted that the independent claims from which claims 6-11, 16, 19-20, 35-37 and 42-43 depend are separately allowable. Accordingly, withdrawal of the objection to claims 6-11, 16, 19-20, 35-37 and 42-43 and allowance of these claims is respectfully requested.

### Rejection under 35 U.S.C. § 112, first paragraph

Claim 1 stands rejected under 35 U.S.C. § 112, first paragraph, because, according to the office action, claim 1 is a single means claim.

This rejection is respectfully traversed. Claim 1 does not recite a “means” limitation as permitted by 35 U.S.C. § 112, sixth paragraph. Claim 1 as amended recites:

1. An artificial magnetic conductor (AMC) comprising:  
a frequency selective surface (FSS) having an effective sheet capacitance which is  
variable to control resonant frequency of the AMC.

A “means” limitation under 35 U.S.C. § 112, sixth paragraph, is identifiable by the function the limitation performs as opposed to the specific structure, material or acts that perform the function. MPEP 2181. However, the frequency selective surface (FSS) element of claim 1 is not characterized by its function but by its performance and operational characteristics. Specifically, the artificial magnetic conductor (AMC) that is the subject of claim 1 includes an FSS. The FSS has an effective sheet capacitance. That effective sheet capacitance can be varied to reconfigure the surface impedance of the AMC, and thereby control the resonant frequency of the AMC. This limitation does not define a function of the FSS but a characteristic or property, a

variable, effective sheet capacitance. No function is specified for the FSS, so the FSS is not written as a “means” limitation.

Moreover, the invention defined by claim 1 is not the type implicated by the prohibition against single means claims. A single means claim which covers every conceivable means for achieving the stated purpose is non-enabling for the scope of the claim, because the specification discloses at most only those means known to the inventor. MPEP 2164.08(a), citing *in re Hyatt*, 708 F.2d 712, 714-715, 218 USPQ 195, 197 (Fed. Cir. 1983).

Assuming the “stated purpose” of claim 1 or its function is “to control resonant frequency of the AMC,” claim 1 does not cover every conceivable means for achieving that purpose or function. Rather, claim 1 only relates to an AMC which includes an FSS having an effective sheet capacitance which may be varied to reconfigure surface impedance to control AMC resonant frequency. Means exist other than that which varies the effective sheet capacitance “to control resonant frequency of the AMC,” including means which do not vary the FSS sheet capacitance or means which use elements of the AMC other than the FSS. Claim 1 does not cover every conceivable means for achieving this stated purpose and is thus not barred by the doctrine of *In re Hyatt*.

Accordingly, withdrawal of the 35 U.S.C. § 112, first paragraph, rejection of claim 1 is respectfully requested.

#### Prior Art Rejections

Claims 1-5, 12-15, 17-18, 30-34, 38-41 and 44 stand rejected based on two different prior art references. Reconsideration of the rejections of these claims is respectfully requested.

#### The Sievenpiper reference

Claims 1 and 2 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Sievenpiper, PCT patent application WO 01/73893. According to the Office Action, Figures 7 and 8 of the Sievenpiper reference disclose a frequency selective surface having a variable effective sheet capacitance.

With this paper, a Declaration Under 37 CFR § 1.131 (“the Declaration”) signed by the inventors of the present application has been submitted as evidence that the claimed subject

matter was invented prior to the effective date of the Sievenpiper reference. Specifically, the Declaration makes clear that the invention defined by claim 1 was conceived at least prior to March 29, 2000. Moreover, the Declaration further makes clear that the invention defined by this claim was diligently developed during a period beginning before March 29, 2000 and that the invention defined by claim 1 was successfully reduced to practice before September 30, 2000.

Regarding conception and reduction to practice of the invention of claims 1 and 2, the Declaration of the inventors states that Exhibit A of the Declaration discloses an artificial magnetic conductor (AMC) with a capacitive frequency selective surface (FSS) (Declaration, paragraph 4). Exhibit A is a proposal for work on a project entitled "Antennas in Reconfigurable High Impedance Electromagnetic Surfaces" (the Project). This proposal was submitted to DARPA/ETO and includes a cover statement that it contains proprietary information not to be disclosed outside the U.S. Government. Each page of this document includes a reminder that use and disclosure of data on each page is subject to the restrictions of the cover statement.

Exhibit A describes two approaches for reconfiguring an AMC, including "modify[ing] the FSS effective sheet capacitance" (Declaration, paragraph 5). Exhibit A also shows proposed hardware embodiment suitable to achieve the desired reconfigurability of the (Declaration, paragraph 6). As evidenced by the Declaration and Exhibit A, the invention of claims 1 and 2 was clearly conceived and substantially reduced to practice before March 29, 2000.

Regarding subsequent fabrication and testing of the invention defined by claims 1 and 2, the Declaration and Exhibits B, C, D and E make clear that a working model was demonstrated by September 30, 2000. Exhibit B includes slides from a Technical Interchange Meeting held among individuals contributing toward the Project. Exhibits C, D and E are portions of progress reports for the Project proposed in the document of Exhibit A. The progress reports are made to the sponsoring agency, the United States Air Force Research Laboratory and summarize work completed during the reporting period.

Exhibit B shows four phases of development of the Project, including creating an electrically thin AMC, fabricating wire antenna elements in close proximity to the AMC and electronically reconfiguring the resonant frequency of the AMC" (Declaration, paragraph 8). These development phases were further specified as Tasks to be completed. The first task, Task 1.1, was development, design, modeling, fabrication and modeling of hardware concepts for

increased bandgap AMCs. The second task, Task 1.2, built on the results of the Task 1.1, and included development of a reconfigurable bandgap AMC (Declaration, paragraphs 9-12).

Exhibits C, D and E report progress made toward completion of the Tasks of the Project. In particular, Exhibit C illustrates that work on the first Task was progressing and that, some expenditures had begun on Task 1.2 and that, for the month ahead, it was planned to finalize design work on a reconfigurable AMC (Declaration, paragraphs 15-16). Exhibit D describes progress made toward modeling a reconfigurable AMC (Declaration, paragraph 18). Exhibit E describes analysis and test results of a completed reconfigurable AMC and shows measured reflection phase and surface wave performance for a reconfigurable AMC (Declaration, paragraphs 21-23).

Thus, by the time the progress report of Exhibit E, the Project had been under way to develop a reconfigurable AMC with a frequency selective surface (FSS) having an effective sheet capacitance which is variable to control resonant frequency of the AMC (Task 1.2), along with its technological precursor, a passive broadband AMC (Task 1.1). Exhibit E makes clear that the invention of claims 1 and 2 had been sufficiently tested to demonstrate that it would work for its intended purpose.

Moreover, the Declaration and its exhibits make clear that the inventors acted with reasonable diligence to reduce to practice any aspects of their invention not previously reduced to practice as evidenced by Exhibit A. Exhibit B, the slides from the Technical Interchange Meeting, show work over the previous six months, before the April 10, 2000 meeting. Exhibits C, D, and E show work during subsequent months until successful demonstration of a reconfigurable AMC. This work included development of a passive broadband AMC under Task 1.1 and development of a reconfigurable AMC under Task 1.2. Accordingly, it is respectfully submitted that applicants invented the claimed subject matter prior to the invention thereof by Sievenpiper.

Since the invention defined by claim 1 was invented prior to the date of invention evidenced by the Sievenpiper reference, this reference can not anticipate the invention of claim 1. Claim 2 is dependent from claim 1 and adds further limitations thereto, and is allowable for the same reasons. Accordingly, withdrawal of the 35 U.S.C. § 102(b) rejection of claims 1 and 2 is respectfully requested.

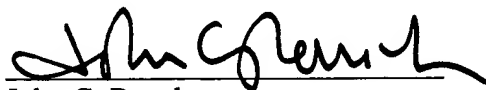
The Daryoush reference

Claims 1-5, 12-15, 17-18, 30-34, 38-41 and 44 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U. S. Patent number 4,751,513 to Daryoush ("Daryoush"). This rejection is respectfully traversed. Daryoush relates to a device which controls electromagnetic radiation or other antenna characteristics in response to light. The Daryoush reference does not pertain to an artificial magnetic conductor (AMC) at all, as that term is used by those ordinarily skilled in the art of antenna design or in the context of the present application, beginning at page 1. In the Daryoush patent, a single microstrip patch antenna is modified by use of a photosensitive material (PIN diode). The structure described will not exhibit high surface impedance or a surface wave bandgap over any prescribed frequency band, characteristics of artificial magnetic conductors.

Independent claims 1, 12, 21, 26 and 33 are directed to an AMC. Claim 30 is directed to a method for reconfiguring an AMC. Claim 44 is directed to a high impedance surface. Daryoush fails to disclose any of these embodiments of the present invention. Accordingly, Daryoush can not anticipate the present invention defined by claims 1-5, 12-15, 17-18, 30-34, 38-41 and 44. Withdrawal of the rejection under 35 U.S.C. § 102(b) of these claims is respectfully requested.

With this response, the application is believed to be in condition for early action on the merits. Should the examiner deem a telephone conference to be of assistance in advancing the application to allowance, the examiner is invited to call the undersigned attorney at the telephone number below.

Respectfully submitted,



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